Promoting Children's Physical Activity using Adaptive Playgrounds

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Abstract – This abstract introduces the innovative Playware playground and how it can be utilized for promoting children's physical activity and thus partly addressing issues related to increasing obesity problems in the western society [1]. Playware allows for the use of intelligent technology to create the kind of leisure activity normally labeled play, i.e. intelligent hardware and software which aims at producing play and playful experiences amongst users. Playware with ambient intelligence characteristics can be personalized, adaptive and anticipatory: it can be integrated into real physical environments (i.e. playgrounds) so that users can freely and interactively utilize it allowing emergence of creative and active plays [2].

Experiments within the Playware playground have demonstrated a significant correlation between the level of children's perceived entertainment (fun) and the average response time that children interact with the playground [3]. The obtained effect appears to be consistent with theoretical approaches on the interplay between response time and the engagement level within human computer interactive systems [4]. Moreover, preliminary studies on physiological signals of children playing with Playware games have already shown the significant effect of average heart rate (HR) to children's entertainment [5]. Thus the hypothesis drawn here is that the higher the average response time of children during a game the higher the entertainment value of the game and furthermore the higher their physical activity through their average HR.

The Playware playground has been augmented with an intelligent adaptation mechanism, which efficiently recognizes an individual child's playing behavior and adapts the playground game according to the child's individual desires. Several experiments have been conducted using adaptation mechanisms designed in order to increase children's physical activity. It has been shown, that individual play characteristics, such as the total number of interactions with the playground and the average response time of the interactions increase significantly with the use of the adaptation mechanism, providing evidence for the mechanism's appropriateness to effectively augment the game's entertainment value and promote children's physical activity [6].

References

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